REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

REGION - X

MISAMIS ORIENTAL 2ND DISTRICT ENGINEERING OFFICE

BALASE ST. EL SALVADOR CITY, MISAMIS ORIENTAL

C.Y. 2025 PROJECT
DETAILED ENGINEERING DESIGN PLAN FOR
CONSTRUCTION OF RAINWATER COLLECTION SYSTEM

1. INITAO CENTRAL SCHOOL, BRGY. POBLACION, INITAO, MISAMIS ORIENTAL
2. INITAO NATIONAL COMPREHENSIVE HIGH SCHOOL, BRGY. POBLACION, INITAO, MISAMIS ORIENTAL
3. INITAO COLLEGE, BRGY. JAMPASON, INITAO, MISAMIS ORIENTAL
4. LIBERTAD NATIONAL HIGH SCHOOL, BRGY. POBLACION, LIBERTAD, MISAMIS ORIENTAL
5. TESDA BUILDING, BRGY. POBLACION, LIBERTAD, MISAMIS ORIENTAL
6. GSO BUILDING, BRGY. POBLACION, LIBERTAD, MISAMIS ORIENTAL

SUBMITTED:

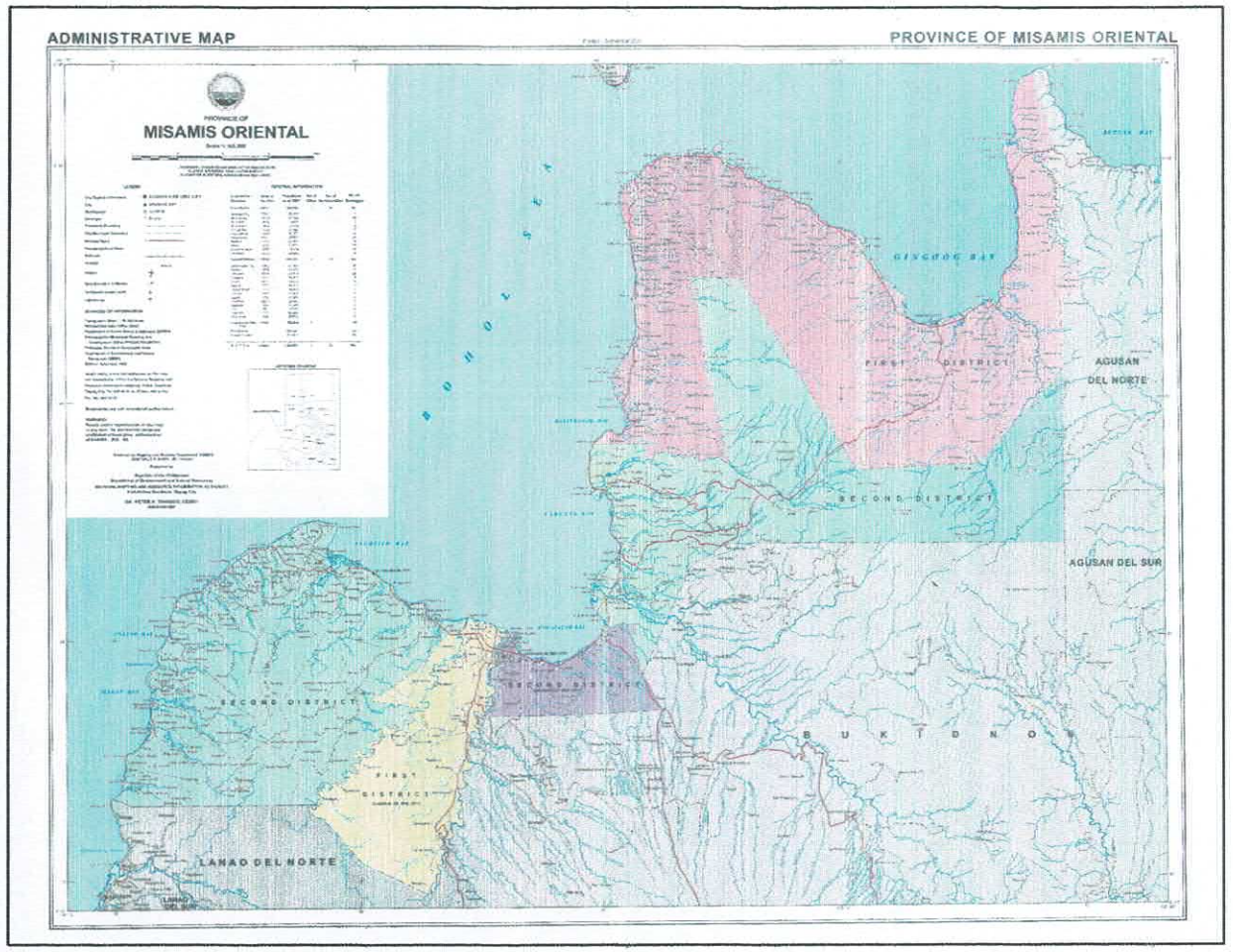
MARINA A. RABANES
CHIEF, PLANNING AND DESIGN SECTION
DATE:

RECOMMENDED:

JIM B. RAMOS
ASSISTANT DISTRICT ENGINEER
DATE:

APPROVED:

ACHILLES B. PIMENTEL
DISTRICT ENGINEER
DATE:



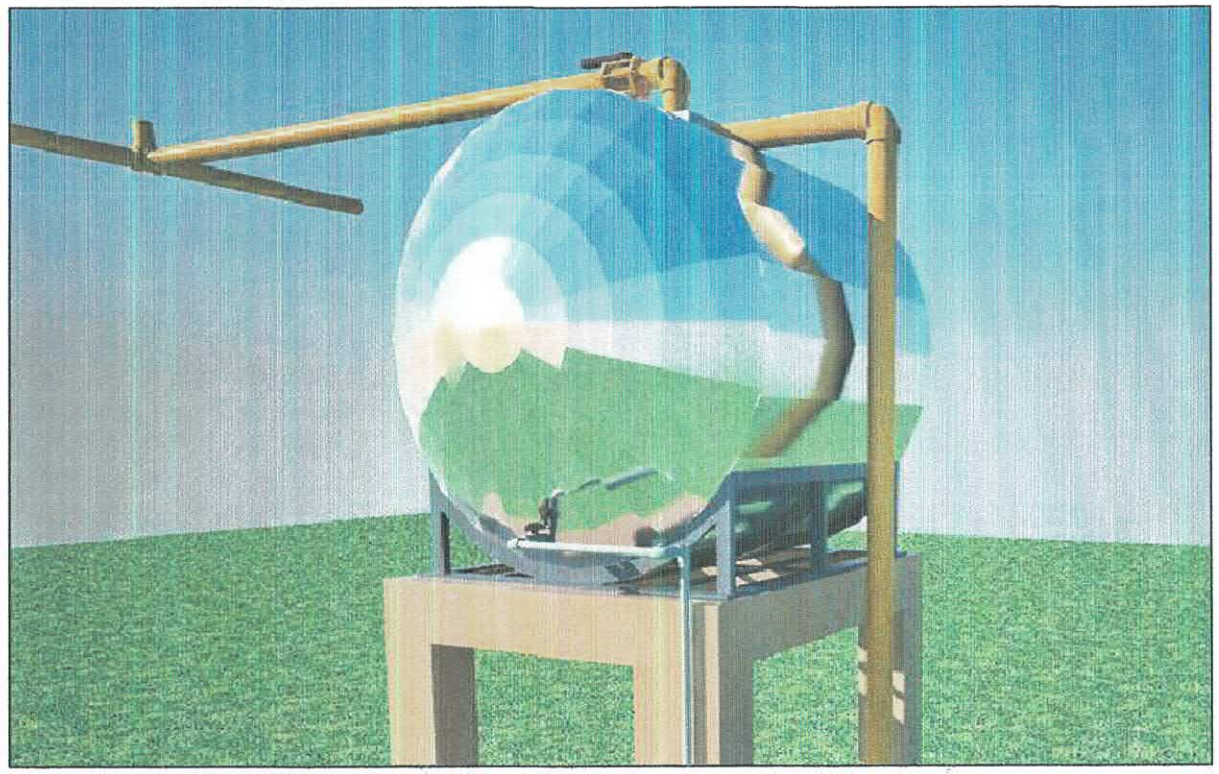
PROPOSED LOCATION/MAP PLAN

SCALE: DRAWN NOT TO SCALE

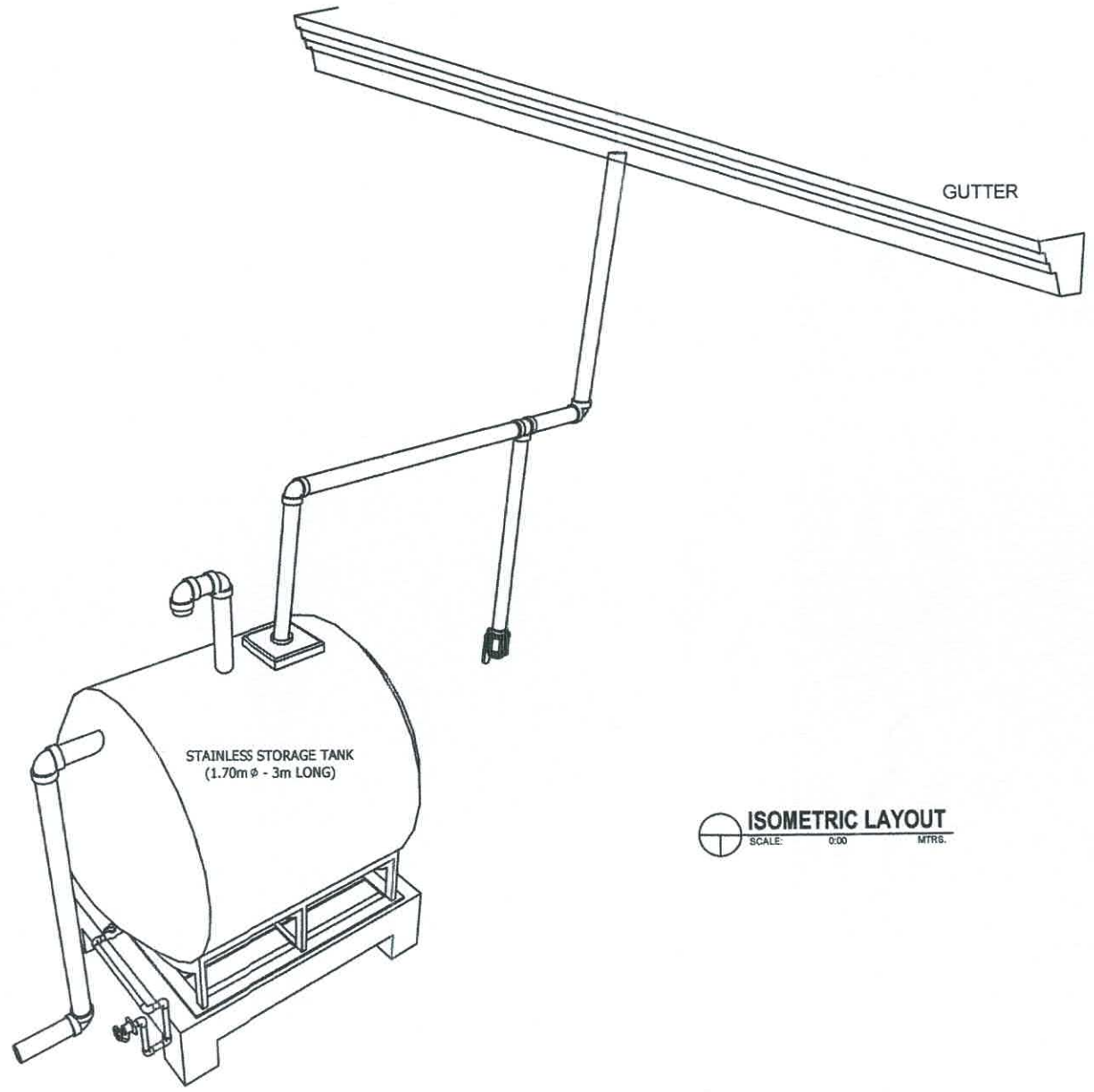
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION - X

MISAMIS ORIENTAL 2ND DISTRICT ENGINEERING OFFICE
OFFICE OF THE DISTRICT ENGINEER
Balase St., El Salvador City, Misamis Oriental

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
C.Y. 2025 PROJECT DETAILED ENGINEERING DESIGN PLAN FOR **CONSTRUCTION OF RAINWATER COLLECTOR SYSTEM, LIBERTAD & INITAO, MISAMIS ORIENTAL**	PROPOSED RAINWATER COLLECTOR SYSTEM LOCATION/MAP PLAN	**FLORANTE T. MARTINEZ** ENGINEERING ASSISTANT PREPARED: **JERUBEN P. TAGLE** ENGINEER II	**NOLI LEMON M. NUEVAS** ENGINEER II DATE:	**MARINA A. RABANES** CHIEF, PLANNING AND DESIGN SECTION DATE:	**JIM B. RAMOS** ASSISTANT DISTRICT ENGINEER DATE:	**ACHILLES B. PIMENTEL** DISTRICT ENGINEER DATE:		2 7



PERSPECTIVE PLAN
SCALE: 0.00 MTRS.



ISOMETRIC LAYOUT
SCALE: 0.00 MTRS.

PERSPECTIVE & ISOMETRIC LAYOUT

SCALE: DRAWN NOT TO SCALE

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION - X
MISAMIS ORIENTAL 2ND DISTRICT ENGINEERING OFFICE
OFFICE OF THE DISTRICT ENGINEER
Balase St., El Salvador City, Misamis Oriental

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
C.Y. 2025 PROJECT DETAILED ENGINEERING DESIGN PLAN FOR **CONSTRUCTION OF RAINWATER COLLECTOR SYSTEM,** **LIBERTAD & INITAO, MISAMIS ORIENTAL**	PERSPECTIVE PLAN & ISOMETRIC LAYOUT	FLORANTE T. MARTINEZ ENGINEERING ASSISTANT PREPARED: JERUBEN P. TAGLE ENGINEER II	NOLI LEMON M. NUEVAS ENGINEER II DATE:	MARINA A. RABANES CHIEF, PLANNING AND DESIGN SECTION DATE:	JIM B. RAMOS ASSISTANT DISTRICT ENGINEER DATE:	ACHILLES B. PIMENTEL DISTRICT ENGINEER DATE:		3 7

GENERAL NOTES FOR STRUCTURAL WORKS:

ALL WORKS AND MATERIALS SHALL COMPLY WITH THE TECHNICAL SPECIFICATIONS OF THIS PROJECT. ANY WORK OR MATERIAL NOT SPECIFIED IN THE TECHNICAL SPECIFICATIONS SHALL COMPLY WITH THE FOLLOWING NOTES AND BUILDING CODE REQUIREMENTS FOR CONCRETE AND REINFORCEMENT DETAILING.

a) ACI–318R–99 AMERICAN CONCRETE INSTITUTE

b) NSCP 2001–4TH EDITION NATIONAL STRUCTURAL CODE OF THE PHILIPPINES

MATERIALS

1. CONCRETE

a) UNLESS OTHERWISE INDICATED OR SPECIFIED ON THE PLANS, THE CONCRETE STRENGTH SHALL BE 20.7 MPa (3000psi)

b) UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR APPROVED, THE NOMINAL MAXIMUM SIZE AGGREGATE USED IN CONCRETE SHALL BE AS FOLLOWS:

b.1) 37mm FOR CONCRETE IN WALLS, SLABS AND SECTIONS MORE THAN 600mm IN THICKNESS.

b.2) 20mm FOR CONCRETE IN WALLS, SLABS AND SECTIONS BETWEEN 250mm AND 600mm IN THICKNESS.

b.3) 12.5mm FOR THIN SECTION PRECAST CONCRETE AND SECOND STAGE CONCRETE FOR PLANT EMBEDMENT.

2. REINFORCING STEEL

a) REINFORCING STEEL BARS SHALL BE DEFORMED CONFORMING TO ASTM A615M.

b) UNLESS OTHERWISE INDICATED ON THE PLANS, THE REINFORCING STEEL GRADE SHALL BE:

- •16MMø AND LARGER GRADE 60 (Fy=415MPa)
- •12MMø AND SMALLER GRADE 40 (Fy=275MPa)

c) REINFORCING STEEL SHALL BE FREE OF MILL SCALES, OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.

3. SOIL BEARING CAPACITY

a) ACTUAL SOIL BORING TEST, WHEN REQUIRED BY THE OWNER SHALL BE CONDUCTED PRIOR TO IMPLEMENTATION OF THE PROJECT.

b) THE CONTRACTOR SHALL INFORM THE STRUCTURAL ENGINEER REGARDING THE ACTUAL SOIL CONDITION DURING THE EXCAVATION OF FOOTING.
Qa = 2,500psf (ASSUMED)

CONSTRUCTION

1. DIMENSIONS AND ELEVATIONS

a) ALL DIMENSIONS SHOWN IN THE DRAWINGS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

b) ALL ELEVATIONS SHOWN IN THE DRAWINGS ARE IN METERS, AND ARE LOCALLY ESTABLISHED BASED ON TEMPORARY BENCH MARK OF THIS PROJECT.

c) DEWATERING SHALL BE DONE PRIOR TO INSTALLATION OF REINFORCEMENT AND POURING OF CONCRETE FOR FOOTING.

2. REINFORCED CONCRETE:

A) CONCRETE MIX AND PLACING

a) DESIGN OF CONCRETE MIX SHALL MEET THE MINIMUM DESIGN CONCRETE STRENGTH REQUIREMENTS AS SPECIFIED IN THE TECHNICAL SPECIFICATION AND AS GIVEN UNDER ITEM 1 OF MATERIALS.

b) CONCRETE SHALL BE DEPOSITED, VIBRATED AND CURED IN ACCORDANCE WITH THE SPECIFICATIONS.

c) UNLESS OTHERWISE SHOWN ON THE DRAWINGS, CONCRETE DEPOSITED AGAINST THE GROUND SHALL BE PROVIDED WITH LEVELLING CONCRETE WITH A MINIMUM THICKNESS OF 50mm PRIOR TO THE INSTALLATION OF STEEL REINFORCEMENT. THIS LEVELLING CONCRETE SHALL NOT BE CONSIDERED IN MEASURING THE STRUCTURAL DEPTH OF CONCRETE SECTION.

d) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER THE PLACING SEQUENCES OF STEEL REINFORCEMENT FOR ALL CONCRETING WORKS.

B) BAR BENDING, SPLICING AND PLACING

REINFORCING STEEL BARS SHALL NOT BE FIELD BENT UNLESS PERMITTED BY THE ENGINEER. INDICATING THE BENDING, CUTTING, SPLICING AND INSTALLATION OF ALL REINFORCING BARS.

a) THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

b) BARS PARTIALLY EMBEDDED IN CONCRETE SHALL BE BENT COLD.

c) BAR SPLICES

UNLESS OTHERWISE SPECIFIED, SPLICE LENGTH OF REBARS SHALL BE AS IN THE FOLLOWING TABLES:

BAR DIAMETER (mm)	SPLICE LENGTH Ld (mm)
12	530
16	705
20	880
25	1375
28	1540
32	1760

NOTES :

c.1) FOR BUNDLED BARS, SPLICED LENGTH Ld SHALL BE MULTIPLIED BY 1.10.

c.2) FOR THREE (3) – BUNDLED BARS, Ld SHALL BE MULTIPLIED BY 1.20.

c.3) FOR FOUR (4) – BUNDLED BARS, Ld SHALL BE MULTIPLIED BY 1.30.

c.4) BARS SPLICING NOT INDICATED ON THE DRAWINGS SHALL BE REFERRED TO THE ENGINEER FOR FINAL APPROVAL.

c.5) WELDED SPLICES, IF APROVED BY THE ENGINEER, SHALL DEVELOP IN TENSION AT LEAST 125% OF THE SPECIFIED YIELD STRENGTH OF THE BARS. IF WELDED, REBARS MUST BE WELDABLE GRADE.

c.6) NOT MORE THAN 50% OF THE BARS AT ANY ONE SECTION SHALL BE SPLICED.

c.7) UNLESS OTHERWISE SHOWN ON THE DRAWINGS, THE CLEAR DISTANCE BETWEEN PARALLEL BARS IN A LAYER SHALL NOT BE LESS THAN 1.5 TIMES THE MAXIMUM SIZE OF COARSE AGGREGATE. THE CLEAR DISTANCE BETWEEN LAYERS SHALL NOT BE LESS THAN 25mm NOR ONE BAR DIAMETER. THE BARS IN THE UPPER LAYER SHALL BE PLACED DIRECTLY ABOVE THOSE IN THE BOTTOM LAYER.

c.8) HOOK AND BENDS.

a) DIMENSION OF 90–DEGREES AND 180–DEGREES HOOKS

C) CONCRETE COVER TO REINFORCEMENT

a) THE MINIMUM CONCRETE COVER TO REINFORCEMENT SHALL BE AS FOLLOWS UNLESS OTHERWISE SPECIFIED:

TYPE OF STRUCTURE	COVER (mm)
STRUCTURES UNDER WATER	75
CONCRETE CAST AGAINST EARTH	75
CONCRETE EXPOSED TO WEATHER	50
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND: SLABS, WALLS BEAMS, COLUMNS	 20 40

D) CONSTRUCTION JOINT

a) THE POSITION AND FORM OF ANY CONSTRUCTION JOINT SHALL BE AS SHOWN ON DRAWINGS OR AS AGREED WITH THE ENGINEER.

b) THE INTERFACE BETWEEN THE FIRST AND SECOND POUR CONCRETE SHALL BE ROUGHENED WITH AN AMPLITUDE OF 6mm MINIMUM.

E) FALSEWORK, TEMPORARY STRUCTURES

a) ALL FALSEWORK AND TEMPORARY STRUCTURES SHALL BE DESIGNED BY THE CONTRACTOR AND DETAIL ARE TO BE SUBMITTED TO THE ENGINEER.

F) FORMWORK

a) UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER, THE FOLLOWING MINIMUM STRIPPING TIMES SHALL BE USED:

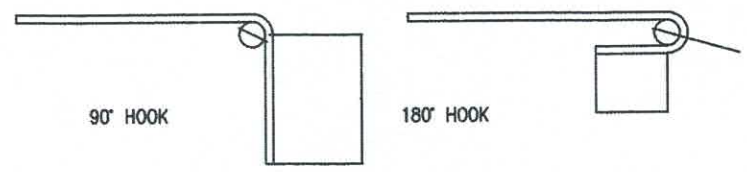
3. STRUCTURAL STEEL

a) STRUCTURAL STEEL SHALL CONFORM TO ASTM A36(Fy=248MPa) SPECIFICATIONS. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS FOR ALL STRUCTURAL STEEL WORK. THESE SHOP DRAWINGS SHALL BE APPROVED BY THE ENGINEER BEFORE ANY START OF FABRICATION.

b) ALL EXPOSED SURFACES SHALL BE PAINTED FOR CORROSION (GALVANIZE OR EPOXY PAINT) PROTECTION IN ACCORDANCE WITH THE AISC SPECIFICATIONS.

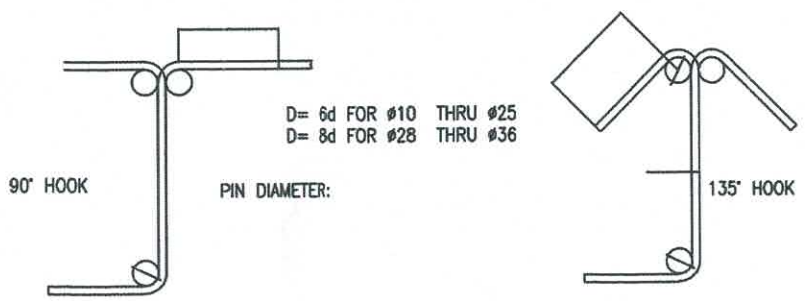
c) ALL WELDINGS SHALL BE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY LATEST EDITION.

	MINIMUM TIME	MINIMUM % OF DESIGN STRENGTH
VERTICAL SIDES OF BEAMS, WALL, PILES, PILE CAPS AND COLUMNS, LIFT NOT EXCEEDING 1.2 m.	24 HOURS	70
VERTICAL SIDES OF BEAMS AND WALLS, LIFT EXCEEDING 1.2 m.	36 HOURS	70
SOFFITS OF MAIN SLABS AND BEAMS	14 DAYS	80
REMOVAL OF PROPS FROM BEAMS AND MAIN SLABS AND OTHER WORK.	14 DAYS	80



PIN DIAMETER: D= 6d FOR ø10 THRU ø25
D= 8d FOR ø28 THRU ø36

b) DIMENSION FOR STIRRUPS AND TIE HOOKS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION - X
MISAMIS ORIENTAL 2ND DISTRICT ENGINEERING OFFICE
OFFICE OF THE DISTRICT ENGINEER
Balase St., El Salvador City, Misamis Oriental

PROJECT NAME AND LOCATION:
C.Y. 2025 PROJECT
DETAILED ENGINEERING DESIGN PLAN FOR
CONSTRUCTION OF RAINWATER COLLECTOR SYSTEM,
LIBERTAD & INITAO, MISAMIS ORIENTAL

SHEET CONTENTS:
GENERAL NOTES FOR STRUCTURAL WORKS

DRAFTED: FLORANTE T. MARTINEZ, ENGINEERING ASSISTANT
PREPARED: JERUBEN P. TAGLE, ENGINEER II

REVIEWED: NOLI LEMON M. NUEVAS, ENGINEER II, DATE:
SUBMITTED: MARINA A. RABANES, CHIEF, PLANNING AND DESIGN SECTION, DATE:
RECOMMENDED: JIM B. RAMOS, ASSISTANT DISTRICT ENGINEER, DATE:
APPROVED: ACHILLES P. PIMENTEL, DISTRICT ENGINEER, DATE:

SET NO.
SHEET NO. 4 / 7

SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
PART I	**OTHER GENERAL REQUIREMENTS**		
B.5 (1)	PROJECT BILLBOARD/ SIGNBOARD	12.00	ea.
B.7 (1)	OCCUPATIONAL SAFETY AND HEALTH PROGRAM	1.00	l.s.
PART II	**CIVIL, MECHANICAL, ELECTRICAL AND SANITARY/ PLUMBING WORKS**		
PART A	**EARTHWORKS**		
803(1)a	STRUCTURE EXCAVATION (COMMON SOIL)	9.22	cu.m.
PART B	**PLAIN AND REINFORCED CONCRETE WORKS**		
900(1)c	STRUCTURAL CONCRETE (CLASS A, 28 DAYS)	6.44	cu.m.
902(1)a1	REINFORCING STELL (DEFORMED, GRADE 40)	1,463.73	kg.
PART C	**FINISHING**		
PART D	**PLUMBING/ SANITARY WORKS**		
1002(27)	PLUMBING WORKS	1.00	l.s.

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PROJECT NAME AND LOCATION:
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DETAILED ENGINEERING DESIGN PLAN FOR
CONSTRUCTION OF RAINWATER COLLECTOR SYSTEM,
LIBERTAD & INITAO, MISAMIS ORIENTAL

SHEET CONTENTS:
SUMMARY OF QUANTITIES

DRAFTED:
FLORANTE T. MARTINEZ
ENGINEERING ASSISTANT

PREPARED:
JERUBEN P. TAGLE
ENGINEER II

REVIEWED:
NOLI LEMON M. NUEVAS
ENGINEER II
DATE:

SUBMITTED:
MARINA A. RABANES
CHIEF, PLANNING AND DESIGN SECTION
DATE:

RECOMMENDED:
JIM B. RAMOS
ASSISTANT DISTRICT ENGINEER
DATE:

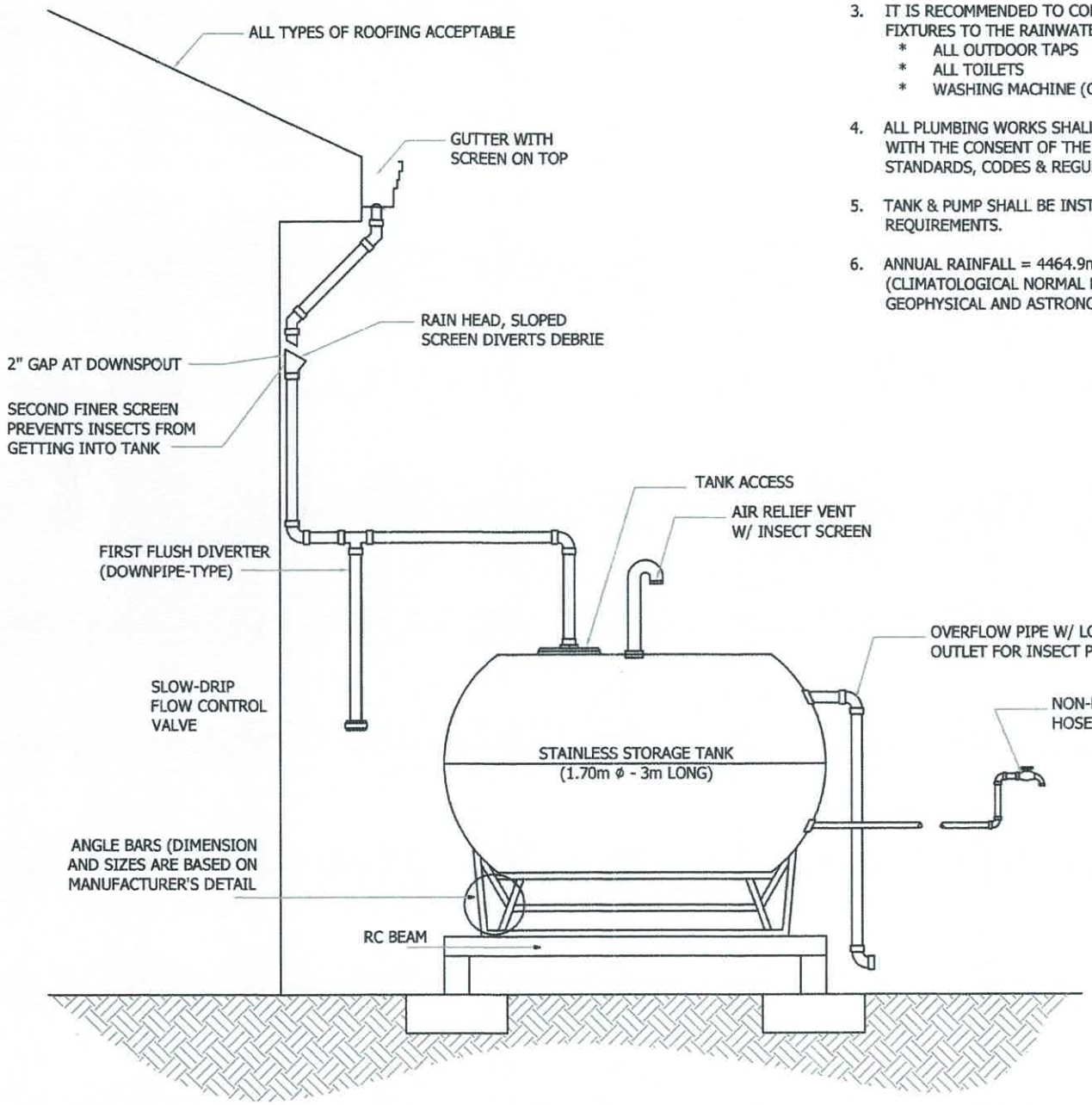
APPROVED:
ACHILLES B. PIMENTEL
DISTRICT ENGINEER
DATE:

SET NO.

SHEET NO.
5
7

NOTE:

1. TANK SHOULD BE FIRM, FLAT & ON STABLE PLATFORM IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. TANK BASE MUST BE SUFFICIENT TO SUPPORT WEIGHT OF TANK WHEN FULL.
2. 100% OF ROOF AREA SHALL DRAIN TO THE TANK.
3. IT IS RECOMMENDED TO CONNECT THE FOLLOWING HOUSEHOLD FIXTURES TO THE RAINWATER TANK SUPPLY:
   * ALL OUTDOOR TAPS
   * ALL TOILETS
   * WASHING MACHINE (COLD TAP)
4. ALL PLUMBING WORKS SHALL BE UNDERTAKEN BY A LICENSED PLUMBER WITH THE CONSENT OF THE MANUFACTURER & IN ACCORDANCE WITH ALL STANDARDS, CODES & REGULATIONS.
5. TANK & PUMP SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S REQUIREMENTS.
6. ANNUAL RAINFALL = 4464.9mm (ACCORDING TO THE HIGHEST (CLIMATOLOGICAL NORMAL RECORDED BY THE PHILIPPINES ATMOSPHERIC GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION (PAGASA)



DETAILS OF CONNECTION

STAINLESS STEEL HORIZONTAL RAINWATER TANK

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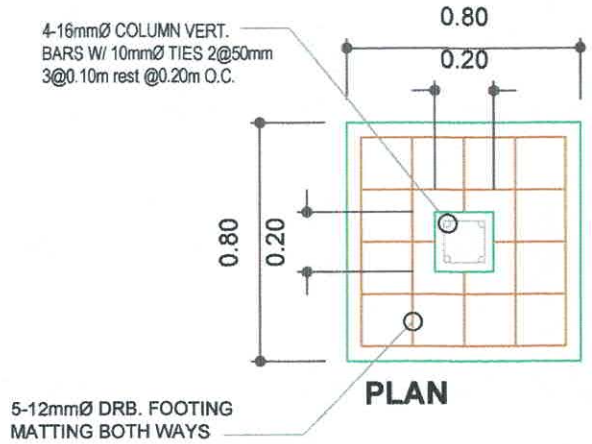

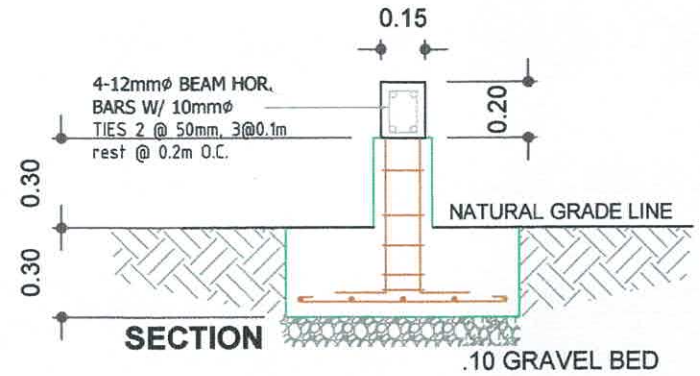

PEDESTAL FOOTING DETAIL

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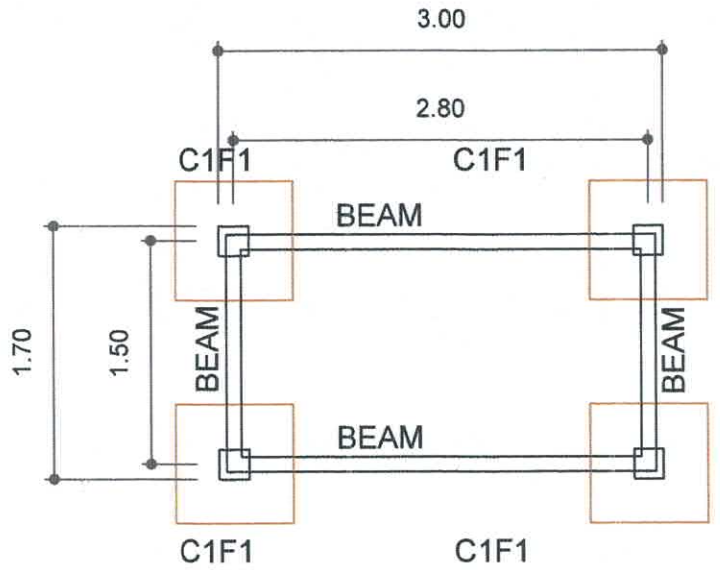


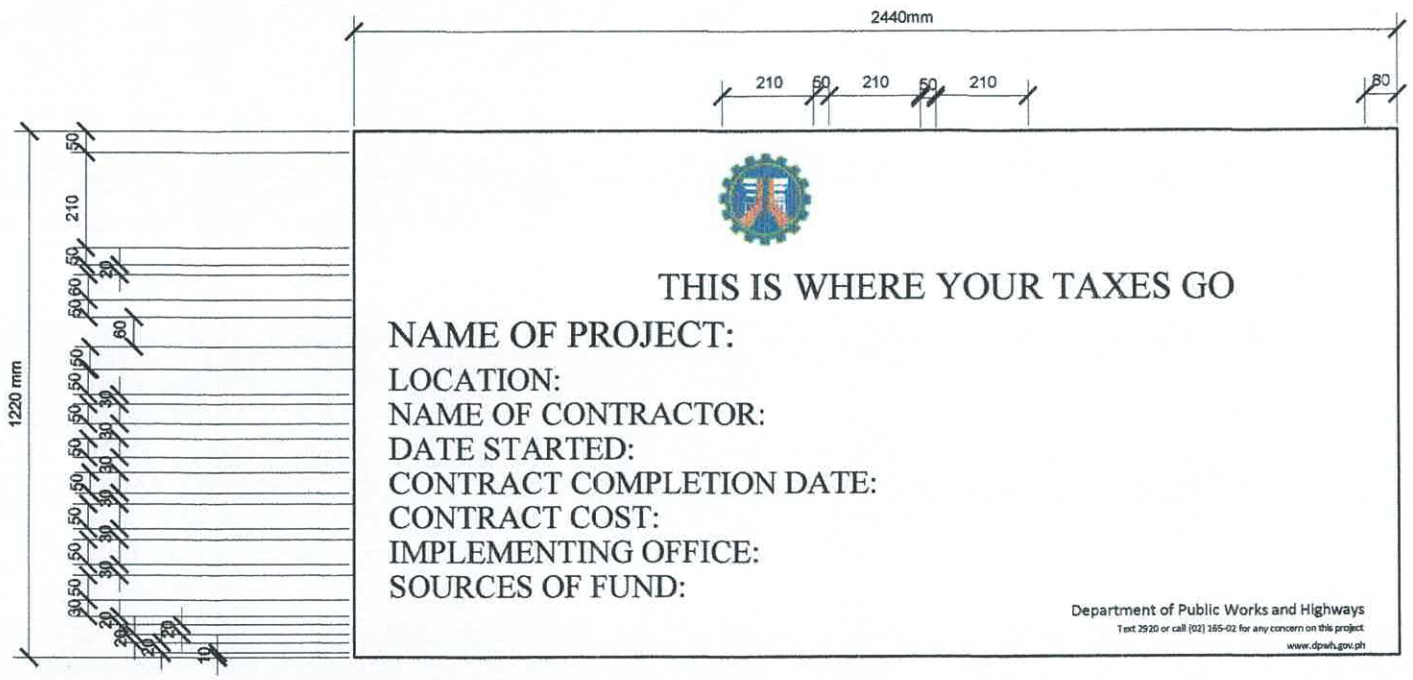
FOUNDATION PLAN

SCALE: 1:50 MTRS.

REPUBLIC OF THE PHILIPPINES **DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS** REGION - X MISAMIS ORIENTAL 2ND DISTRICT ENGINEERING OFFICE OFFICE OF THE DISTRICT ENGINEER Balase St., El Salvador City, Misamis Oriental	PROJECT NAME AND LOCATION: C.Y. 2025 PROJECT DETAILED ENGINEERING DESIGN PLAN FOR **CONSTRUCTION OF RAINWATER COLLECTOR SYSTEM, LIBERTAD & INITAO, MISAMIS ORIENTAL**	SHEET CONTENTS: PROPOSED RAINWATER STEEL TANK FOUNDATION PLAN FOOTING DETAILS	DRAFTED: FLORANTE T. MARTINEZ ENGINEERING ASSISTANT PREPARED: JERUBEN P. TAGLE ENGINEER II	REVIEWED: NOLI LEMON M. NUEVAS ENGINEER II DATE:	SUBMITTED: MARINA A. RABANES CHIEF, PLANNING AND DESIGN SECTION DATE:	RECOMMENDED: JIM B. RAMOS ASSISTANT DISTRICT ENGINEER DATE:	APPROVED: ACHILLES B. PIMENTEL DISTRICT ENGINEER DATE:	SET NO.	SHEET NO. 6 7

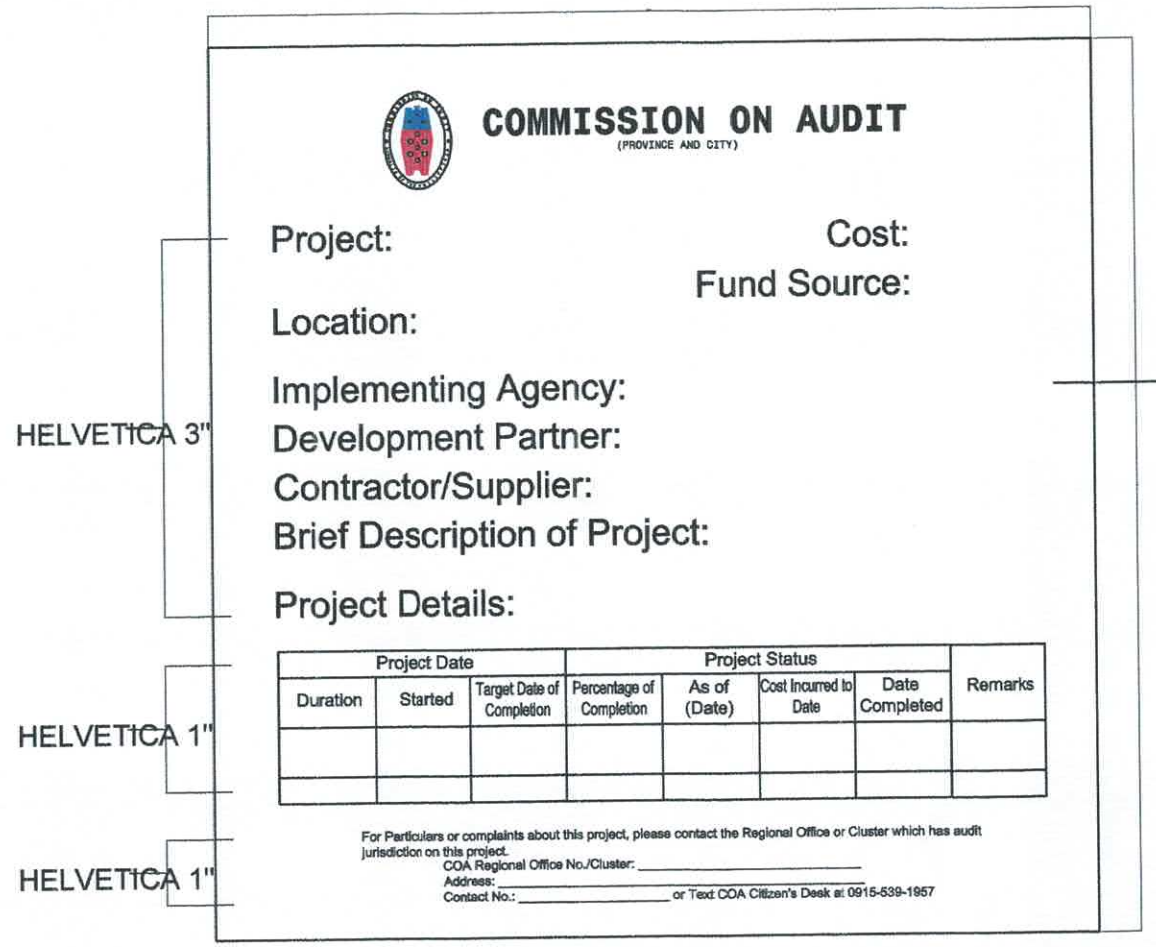
PROJECT BILLBOARD DETAIL

NOTE : THE EXPENSES INCURRED IN THE INSTALLATION OF BILLBOARD IS INCLUDED IN THE OCM PER DO. 141, SERIES 2016



NOTE :
*For Source of Fund, state if DPWH Regular Budget, Priority DevelopmentAssistance Fund, DepEd/DA/DAR Budget, Calamity Fund, MVUC Fund, etc.
*Color Shade Combination for the Yellow Background:

CYAN	:	0
MAGENTA	:	7
YELLOW	:	78
KEY	:	0



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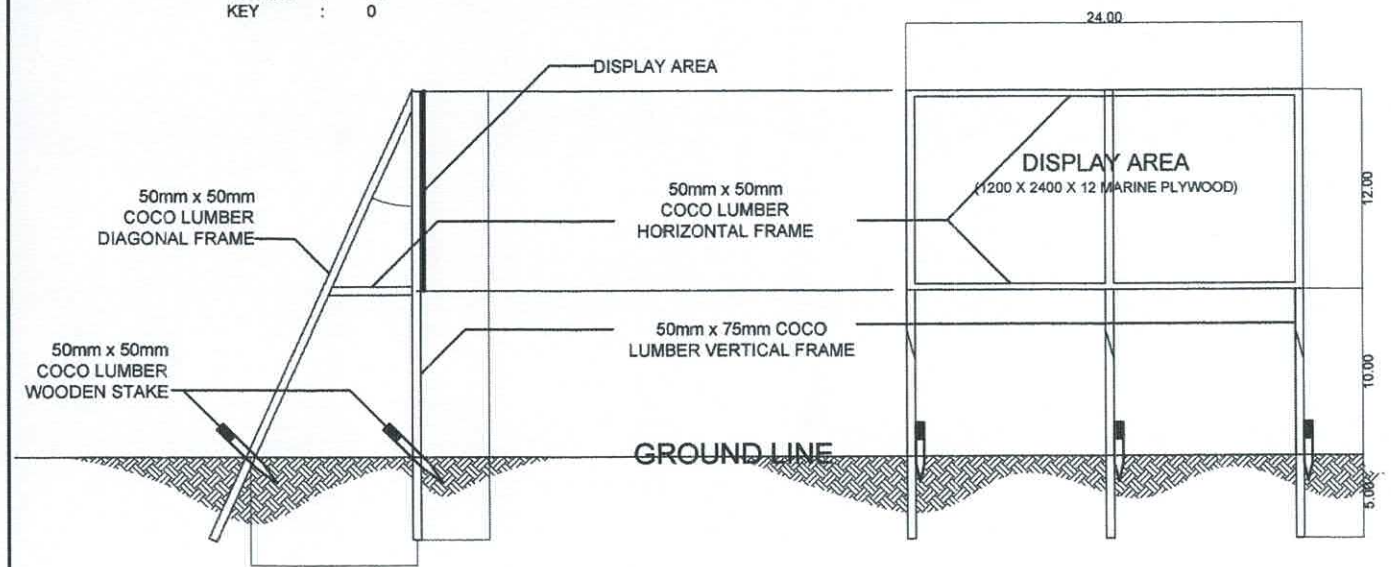
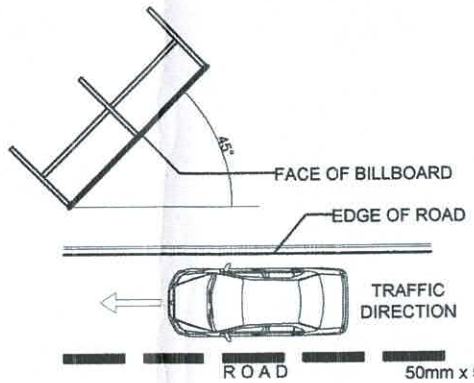
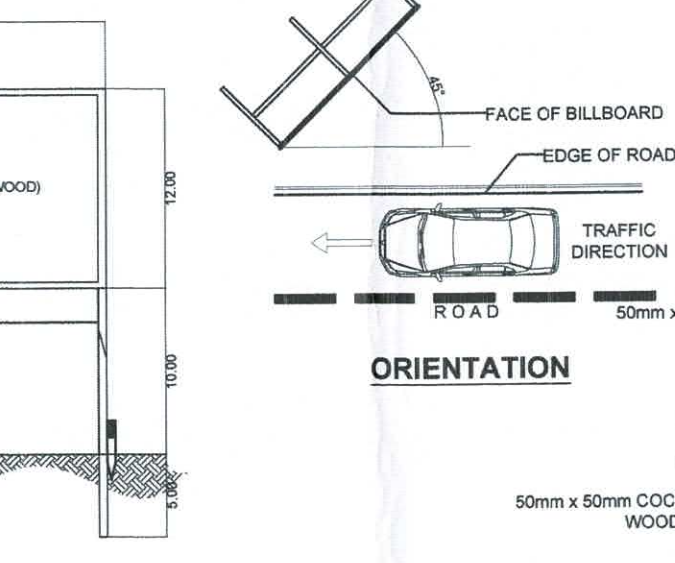


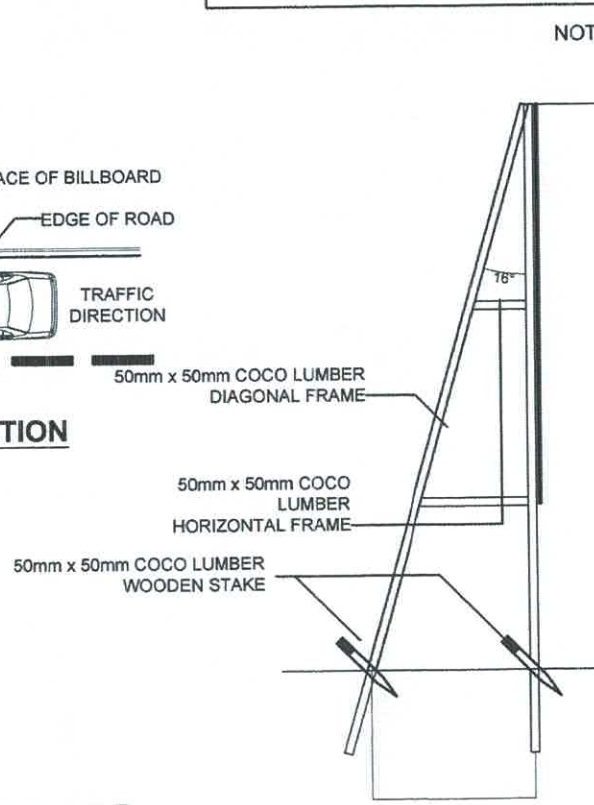
TYPICAL FRAME ELEVATION



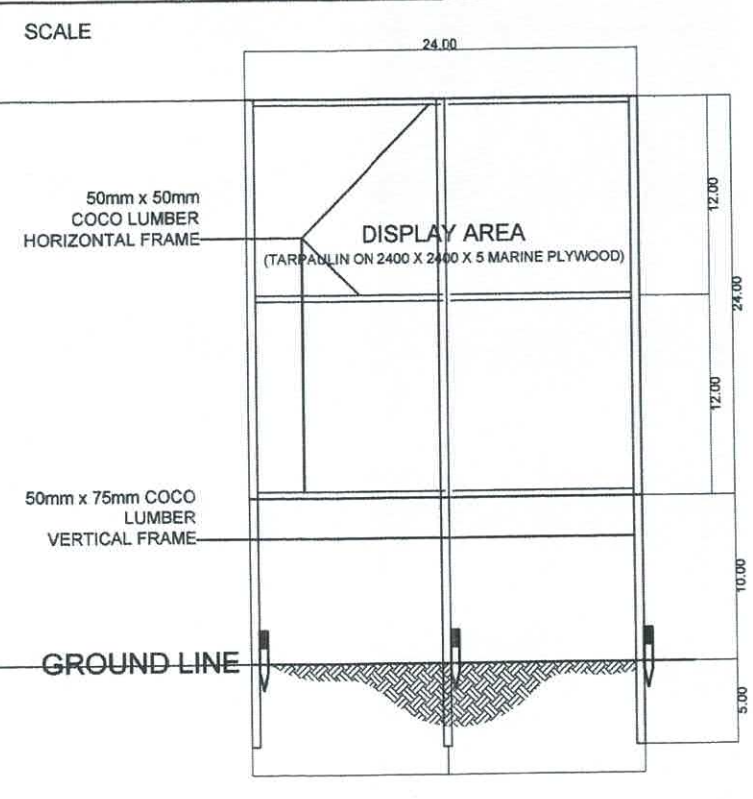
ORIENTATION



FRONT ELEVATION
(OPTION 1)



TYPICAL FRAME ELEVATION



FRONT ELEVATION

SCALE 1 : 25 M.

STANDARD PROJECT BILLBOARD (DPWH and COA)

REPUBLIC OF THE PHILIPPINES **DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS** REGION - X MISAMIS ORIENTAL 2ND DISTRICT ENGINEERING OFFICE OFFICE OF THE DISTRICT ENGINEER Balase St., El Salvador City, Misamis Oriental	PROJECT NAME AND LOCATION: C.Y. 2025 PROJECT DETAILED ENGINEERING DESIGN PLAN FOR **CONSTRUCTION OF RAINWATER COLLECTOR SYSTEM, LIBERTAD & INITAO, MISAMIS ORIENTAL**	SHEET CONTENTS: BILLBOARD DETAILS	DRAFTED: **FLORANTE T. MARTINEZ** ENGINEERING ASSISTANT PREPARED: **JIERUBEN P. TAGLE** ENGINEER II	REVIEWED: **NOLI LEMON M. NUEVAS** ENGINEER II DATE:	SUBMITTED: **MARINA A. RABANES** CHIEF, PLANNING AND DESIGN SECTION DATE:	RECOMMENDED: **JIM B. RAMOS** ASSISTANT DISTRICT ENGINEER DATE:	APPROVED: **ACHILLES B. PIMENTEL** DISTRICT ENGINEER DATE:	SET NO.	SHEET NO. 7 7